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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/714,417 | 11/14/2003 | Shivakumar Sitaraman | 24-NS-120423-6 | 2288 |

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| EXAMINER | |
|---|---|
| PALABRICA, RICARDO J | |
| **ART UNIT** | **PAPER NUMBER** |
| 3663 | |

DATE MAILED: 10/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/714,417 | SITARAMAN ET AL. | |
| | Examiner | Art Unit | |
| | Rick Palabrica | 3663 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) 1-29 is/are pending in the application.

4a) Of the above claim(s) 2,8,9,11,16,17 and 20-29 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1,3-7,10,12-15,18 and 19 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 11/14/03.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

1. Applicant's election with traverse of Group I (Process), species B, species C, and species G, in the reply filed on 8/8/05 is acknowledged.

Applicant traversed the election requirement between the process and apparatus on the grounds that to practice the materially different process cited by the Examiner would require reconfiguration of the apparatus. This argument is unconvincing because the claims are directed to an apparatus, i.e. a computer (hardware). The configuration of this computer (i.e., software) is part of the intended or desired used of the hardware. The alleged reconfiguration pertains to the software and not to the claimed apparatus.

Applicant traversed the cited hand or manual calculations (alternative to computer calculations) as being "unrealistic because of sheer volume of calculations that are needed." The Examiner disagrees. Manual calculations may be inconvenient but not unrealistic, e.g., where computers are unavailable. The Examiner further notes that prior to the advent of computers, complicated systems, including nuclear reactors, were designed using hand calculations and slide rules.

Applicant traversed the species election requirement on the grounds that the species are "related." Applicant also alleged that a search and examination of all claims would not place a serious burden on the examiner. These reasons are not found persuasive because species belonging to one genus are related but it does not follow that they are not patentably distinct. Also, contrary to the requirement in said Office Action, applicant did not submit evidence or identify such evidence now of record

showing the species to be obvious variants or clearly admit on record that this is the case. Also, contrary to applicant's allegation, each of the identified species would require a separate search in view of their mutually exclusive characteristics, and these individual searches would not be co-extensive.

The restriction requirement is still deemed proper and is therefore made **FINAL**.

2. Based on Applicant's election, the Examiner has determined that claims 1, 3-7, 10, 12-15, 18 and 19 read on the elected species. In view of the election and for this examination, the Examiner interprets claim 10 to be dependent from claim 7 instead of claim 9, and claim 18 to be dependent from claim 15 instead of claim 17.

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

***Specification***

3. The specification is objected to under 35 U.S.C. 112, first paragraph, as failing to provide an adequate written description of the invention and as failing to adequately teach how to make and/or use the invention, i.e., failing to provide an enabling disclosure.

The claimed invention is a method for calculating a helium content of stainless steel components in a nuclear reactor. However, there is no adequate or enabling disclosure of how such could be accomplished using the applicant's invention.

On page 3, paragraph 0008 and page 7, paragraph 0023 of the specification, the Applicant discloses an equation for calculating the helium concentration. The disclosure is insufficient and non-enabling in failing to indicate the approximations, assumptions and estimates utilized in arriving at this equation, as well as the bases for the validity these approximations, assumptions and estimates. Clearly, knowledge of these factors is required in order for one to properly apply the equation and operatively practice the invention. The disclosure is specifically insufficient as to: a) whether or not the equation applies to all types of stainless steel (e.g., austenitic, ferritic, etc.); b) the range of neutron fluences for which the equation is valid; c) what exactly does the term "boron" in C refer to – is it natural boron or the isotope boron-10? d) how and in what manner have the competing contributions of other helium-generating impurities in stainless steel (e.g., silicon and nitrogen) been taken into account; e) whether or not the equation applies to all types of reactors and to all designs of a particular reactor type, i.e., does it apply to BWRs, PWRs, CANDU, and LMFBR reactors, and for BWRs and PWRs, for example, does the equation apply to all reactors made by different manufacturers? f) whether or not the equation applies to any reactor regardless of its operating history (e.g., low capacity vs. high capacity operation); g) what is the power level of the reactor and does it remain constant, and if not, what is the power vs. time profile?

Note that the above issues being raised by the Examiner are similar to those that have been raised by other artisans in the art regarding problems on calculation of helium production in stainless steel, as described by Ganesan (IDS OI) or Goel (IDS OJ). Note, in particular, the statement in Ganesan that the relationship between helium content and fluence has been observed to change from being non-linear below a certain fluence threshold and linear above that threshold. This relates to the issue of identification of ranges of neutron fluence for which the claimed equation is valid.

On page 5, paragraphs 0016 and 0017, what is all encompassed by the terms, "pre-, inter-, and post-processor software"?

On page 8, paragraphs 0026 and 0027, the Applicant discloses that a correlation was developed to calculate the production of helium at locations where the neutron field is known. This correlation is based on the results of tests preformed on selected stainless steel samples that were irradiated for a period of one cycle. The disclosure is insufficient as to what exactly were the test parameters and conditions. Again, knowledge of these parameters and conditions is needed in order for one to properly apply the equation, determine potential sources of errors, determine when the correlation and therefore, the equation, is not applicable, and operatively practice the invention. Note in this regard the statement in Ganesan that experimental values of helium produced are subject to error because helium escapes easily during detection (see page 371, 1st column, 3rd paragraph). Note also the statement in Goel regarding quantification of target accuracies for the $(n,\alpha)$ cross section.

On page 9, paragraph 0030, the Applicant discloses that the value of the constant, $b_j$, depends on the location in the reactor and type of neutron fluence. The disclosure is insufficient as to how and in what manner one determines exactly the value of constant to use based on the factors disclosed by the applicant. Specifically, the disclosure is insufficient as to how to what weight one should assign to location and what weight to assign to fluence, and how to exactly combine these two factors into a single $b_j$ value.

***Claim Rejections - 35 USC § 112***

4. Claims 1, 3-7, 10, 12-15, 18 and 19 are rejected under 35 U.S.C. 112, first paragraph, for the reasons set forth in the objection to the specification in section 3 above.

5. Claims 1, 3-7, 10, 12-15, 18 and 19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claims are vague, indefinite and incomplete as to the specific conditions under which the equation is valid, including the range of neutron fluence, type of stainless steel and its impurities, and type of reactor. As presently set forth, the metes and bound of the claims are undefined.

The claims are vague, indefinite and incomplete as to how and in what manner one determines the specific value of the constant $b_j$. The claims are also vague, indefinite and incomplete as to whether a single value of $b_j$ applies to thermal fluence,

fast fluence and total fluence, or whether separate values have to be determined for each type of fluence. As presently set forth, the metes and bound of the claims are undefined.

The claims are misdescriptive and inaccurate because claims 1 and 12, for example, recite a range of values for the constant $b_j$, applicable to fast neutron fluence, that is inconsistent with the specification on page 9, paragraph 0030. Thus, the metes and bounds of the claims cannot be determined.

Claims 4 and 19 recite the limitation "the fuel cycle." There is insufficient antecedent basis for this limitation in the claims.

Claims 10 and 18 are vague, indefinite and incomplete, and its metes and bounds cannot be determined, particularly in regard to the term/phrase "full power phase of the fuel cycle" It is not known what all is meant by or encompassed by this term/phrase.

***Conclusion***

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rick Palabrica whose telephone number is 571-272-6880. The examiner can normally be reached on 6:30-5:00, Mon-Thurs.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RJP
September 29, 2005

R Palabrica